



# CAREER AND TECHNICAL EDUCATION

Operational Guide

for

Occupational and Support Programs

AGRICULTURAL SCIENCE  
AND  
TECHNOLOGY

July 1, 2005

<b>Summary of Changes in Operational Guide</b>	
<b>February 14, 2005</b>  <u>Updated:</u> <ul style="list-style-type: none"> <li>• Course Codes</li> <li>• Equipment Lists</li> </ul>	<b>April 1, 2005</b>  <u>Added:</u> <ul style="list-style-type: none"> <li>• Pathway - Program of Study Crosswalk</li> <li>• Technology Standards for 2006-07</li> </ul> <u>Rearranged:</u> <ul style="list-style-type: none"> <li>• Technology Standards for Career Guidance Areas</li> </ul>
<b>July 1, 2005</b>  <u>Corrections:</u>	
<ul style="list-style-type: none"> <li>• Course Codes</li> </ul>	<ul style="list-style-type: none"> <li>• Pathway Name</li> </ul>

<b>Changes (4/1/05)</b>
<b>Course Codes:</b>
Incomplete sentences in numerous course code descriptions are completed.
<b>Changes (7/1/05)</b>
<b>Agricultural Science and Technology:</b>
Course names starting with "Agriculture" or "Agricultural" in elective courses; Power, Structural, and Technical Systems Pathway; and prerequisites are corrected to match course codes.

## Statement of Assurance

All vocational opportunities are offered without regard to race, color, national origin, sex, handicap, or age. The following civil rights laws protect individuals from discrimination in programs or activities receiving federal financial assistance:

Title IV of the Civil Rights Act of 1964

Title IX of the Education Amendments of 1972

Section 504 of the Rehabilitation Act of 1973

Age Discrimination Act of 1975

**RELATED LINK:** Go to the Department of Labor for assistance with specific laws and regulations,  
<http://www.dol.gov/dol/compliance/compliance-majorlaw.htm>.

Summary of Dates/Forms Associated with Instructional Programs		
Date	Form # and Web Site Address	Name of Form
September 3	( <a href="http://dwe.arkansas.gov/CareerandTechEducation/TeacherInformationSystem.htm">http://dwe.arkansas.gov/CareerandTechEducation/TeacherInformationSystem.htm</a> )	Computer submission of <a href="#"><u>Teacher Information</u></a>
October 1		Notification by letter of schools using concurrent credit to meet standards
October 1	<b>WE-92</b> ( <a href="http://dwe.arkansas.gov/CTESCTENewandExpandedPrograms.htm">http://dwe.arkansas.gov/CTESCTENewandExpandedPrograms.htm</a> )	C & T New Program Start-up Proposals
November 12	( <a href="http://dwe.arkansas.gov/Agriculture/TeacherInfo/ProgramofActivitiesrevised2001.doc">http://dwe.arkansas.gov/Agriculture/TeacherInfo/ProgramofActivitiesrevised2001.doc</a> )	Computer submission of Agriculture Education <a href="#"><u>Chapter Program of Activities</u></a>
February 4	( <a href="http://dwe.arkansas.gov/Agriculture/TeacherInfo/SAE Report02Jan04.xls">http://dwe.arkansas.gov/Agriculture/TeacherInfo/SAE Report02Jan04.xls</a> )	Computer submission of Agriculture Education <a href="#"><u>Supervised Agriculture Experience Report</u></a>
February 15 (or 10 days before first contest)		Computer submission of Agriculture Education FFA membership dues
March 1	( <a href="http://dwe.arkansas.gov/Agriculture/TeacherInfo/SuperiorChapterapplicationrevised2001.doc">http://dwe.arkansas.gov/Agriculture/TeacherInfo/SuperiorChapterapplicationrevised2001.doc</a> )	Computer submission of Agricultural Chapter <a href="#"><u>Superior Chapter Report</u></a>
March 15	<b>WE-4</b> ( <a href="http://dwe.arkansas.gov/CTESCTENewandExpandedPrograms.htm">http://dwe.arkansas.gov/CTESCTENewandExpandedPrograms.htm</a> )	Reimbursement for C & T New Program Equipment
June 1	( <a href="http://dwe.arkansas.gov/Agriculture/TeacherInfo/ANNUALFFAREPORT.doc">http://dwe.arkansas.gov/Agriculture/TeacherInfo/ANNUALFFAREPORT.doc</a> )	<a href="#"><u>Annual FFA Report</u></a>
2 weeks prior to beginning of class	<b>WE-6</b> ( <a href="http://dwe.arkansas.gov/CTESCTEReporting%20Forms.htm">http://dwe.arkansas.gov/CTESCTEReporting%20Forms.htm</a> )	Application for Adult Skill Training Class (no classes will be approved after May 1)
No later than	<b>WE-PD</b>	Adult Skill Training Class

Summary of Dates/Forms Associated with Instructional Programs		
Date	Form # and Web Site Address	Name of Form
2 weeks after completion of class	( <a href="http://dwe.arkansas.gov/CTESCTEReporting%20Forms.htm">http://dwe.arkansas.gov/CTESCTEReporting%20Forms.htm</a> )	Enrollment Report (all reimbursement requests must be received by May 30)

**ARKANSAS DEPARTMENT OF WORKFORCE EDUCATION**  
Three Capitol Mall  
Little Rock, AR 72201  
Web Site Address: <http://dwe.arkansas.gov>

**CAREER AND TECHNICAL EDUCATION**

John L. Davidson, Deputy Director  
E-mail: [john.davidson@arkansas.gov](mailto:john.davidson@arkansas.gov)

Room 401      (501) 682-1040  
Fax:      (501) 682-1026

**Accountability and Funding**

(<http://dwe.arkansas.gov/CTESCTEPerkinsInfo.htm>)

Room 407      (501) 682-1528

Fax:      (501) 682-1026

Mary Ellen Koettel, Program Analyst

E-mail: [mary.koettel@arkansas.gov](mailto:mary.koettel@arkansas.gov)

Perkins and related federally funded programs

Career and technical education coordinators

**Occupational Programs:**

Office of [Agricultural Science and Technology](#)

(<http://dwe.arkansas.gov/Agriculture/ffa.htm>)

Room 501      (501) 682-2561

Fax:      (501) 682-1268

Cluster responsibility: Agriculture, Food, &  
Natural Resources

Marion Fletcher, Program Manager

E-mail: [marion.fletcher@arkansas.gov](mailto:marion.fletcher@arkansas.gov)

## TABLE OF CONTENTS

Program Approval Process.....	<a href="#">7</a>
Pathway – Program of Study Crosswalk .....	<a href="#">8</a>
Course Codes – 2005-06 with Descriptions (by cluster, with licensure codes) .....	<a href="#">9</a>
(Note: Course Codes for 2006-07 will not be included until January 2006)	
Technology Standards (2005-06 and 2006-07) .....	<a href="#">20</a>
Specific Career and Technical Education Program Operational Procedures	
<b><u>Occupational Programs</u></b> (with minimum equipment lists):	
Office of Agricultural Science and Technology Education .....	<a href="#">22</a>
Cluster Responsibility: Agriculture, Food, & Natural Resources	

## PROGRAM APPROVAL PROCESS

If a program was **conditionally approved** during the previous year and one of the following actions apply the following year, then the district will receive the program status indicated.

ACTION	STATUS TO RECEIVE
Problems are corrected	<b>FULL APPROVAL</b>
Problems not corrected	Disapproval
Critical elements from previous year received, and improvement plan not submitted	Disapproval

If a program had **full approval** during the previous year and one of the following actions apply the following year, then the district will receive the program status indicated.

ACTION	STATUS TO RECEIVE
No CTSO previous year	Conditional Approval
No program of study	Conditional Approval
No required foundations (reviewed by appropriate program area)	Conditional Approval
Core not offered every year	Conditional Approval
Meets all DWE standards	<b>FULL APPROVAL</b>

Program approval items reviewed during technical assistance visits and as information is available:

1. All report card items
  - A. Completers
  - B. Career and technical assessment
  - C. Academic attainment
  - D. Placement
  - E. Nontraditional numbers
2. Advisory councils and meeting minutes
3. Safety issues
4. Any item noted as lacking in technical assistance visit

<b>CAREER CLUSTER PATHWAY – PROGRAM OF STUDY CROSSWALK</b>	
<b>2004-05 Program of Study Name</b>	<b>2005-06 Pathway – Program of Study Name</b>

**Agricultural Science and Technology**

***Cluster: AGRICULTURE, FOOD, & NATURAL RESOURCES***

Agribusiness Systems	Agribusiness Systems
Agricultural Mechanics	Power, Structural, & Technical Systems - Agri Mechanics
Agricultural Science - Animal	Animal Systems - Agricultural Science/Animal
Agricultural Science - Plant Sciences	Plant Systems - Agricultural Science/Plant
Horticulture	Plant Systems - Horticulture
Natural Resources/Environmental Service Systems	Natural Resources/Environmental Service Systems



## 2005-06 Career and Technical Course Codes

### CLUSTER: AGRICULTURE, FOOD, & NATURAL RESOURCES (all pathways)

#### **491010 Advanced Animal Science**

Credit: .5 Grade Levels: 9-12

This course is designed at the local level for specialized instruction as determined by the local advisory committee and administration in a specific area of animal science. Pre-requisites would be animal science.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

#### **491020 Agricultural Apprenticeship/Work-Based Learning**

Credit: 1 Grade Levels: 11-12

This course provides for the work-based component of a supervised agriculture experience program with an agriculture employer. It provides the experiential learning concepts that are needed for successful employment.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture  
605 Forestry

#### **491030 Agricultural Business**

Credit: .5 Grade Levels: 9-12

This course provides students with a basis for making effective decisions, setting goals, assessing and solving problems, evaluating the management of resources, and gaining skills useful in everyday life. FFA and SAEs will be covered as well.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture  
605 Forestry

#### **491040 Agricultural Electricity**

Credit: .5 Grade Levels: 9-12

Students will cover electrical terms, careers, sources, tools, and practical wiring. Students will learn to read plans and wire according to plan. They will use hands-on activities and safety will be stressed.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

#### **491050 Agricultural Graphics**

Credit: .5 Grade Levels: 9-12

Students will prepare and read plans related to agricultural projects. They will learn to draw using hand drawing equipment, mechanical equipment, and computer-aided equipment/software. This course has a large amount of hands-on activities.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491060 Agricultural Marketing**

Credit: .5 Grade Levels: 9-12

This course will cover all aspects of marketing agricultural products and services from wholesale to retail, including futures markets, international marketing, and the role of agricultural products and services in the U.S. and world economies.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course:

010	Agriculture
218	Agricultural Sciences & Technology
604	Horticulture
605	Forestry

**491070 Agricultural Metals I**

Credit: .5 Grade Levels: 9-12

This course covers safety, technical information, tool fitting, sheet metal, hot and cold metal work, as well as an introduction to oxyacetylene welding and cutting and arc welding. Safety practices and performance skills will be emphasized in each area.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course:

010	Agriculture
218	Agricultural Sciences & Technology

**491080 Agricultural Metals II**

Credit: .5 Grade Levels: 9-12

This course will cover cold metal, hot metal, fabrication concepts, reading and implementing blueprints as they relate to metal work, arc welding, gas welding, MIG welding, TIG welding, plasma cutting, and careers related to metal work. Safety will be emphasized.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course:

010	Agriculture
218	Agricultural Sciences & Technology

**491090 Agricultural Surveying**

Credit: .5 Grade Levels: 9-12

This is a one-semester course of land surveying, land description, and construction. Surveying also covers GPS, GIS, FFA, and SAE.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course:

010	Agriculture
218	Agricultural Sciences & Technology
605	Forestry

**491100 Agriculture Mechanics I**

Credit: .5 Grade Levels: 9-12

This course connects scientific principles with mechanical skills. This course will enhance the student's understanding of traditional areas of agriculture mechanics.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course:

010	Agriculture
218	Agricultural Sciences & Technology

**491110 Agriculture Mechanics II**

Credit: .5 Grade Levels: 9-12

This course will emphasize agricultural technology, including such topics as electricity, internal combustion engines, metal technology, construction, and the development, role, and scope of mechanical technology in agriculture.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course:

010	Agriculture
218	Agricultural Sciences & Technology

**491120 Agriculture Power Systems I**

Credit: .5 Grade Levels: 9-12

This course covers the basic principles of agricultural power (electrical and internal combustion), maintenance and repair of equipment, career opportunities, and safety.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491130 Agriculture Power Systems II**

Credit: .5 Grade Levels: 9-12

This course is a follow-up course to Ag Power Systems I. It will focus on the technical areas of maintenance and repair of small engines, control and installation of electrical power, electronics, and repair and maintenance of agricultural machinery.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491140 Agriculture Science**

Credit: .5 Grade Levels: 9-12

This is a foundation course for all agriculture programs of study. Topics covered include general agriculture, FFA, leadership, record keeping, Supervised Agriculture Experiences, animal science, and plant science.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture  
605 Forestry

**491150 Agriculture Science & Technology**

Credit: 1 Grade Levels: 9-12

This is a foundation course for all agriculture programs of study. Topics covered include general agriculture, FFA, leadership, record keeping, Supervised Agricultural Experiences (SAEs), animal science, plant science, soil science, and agricultural mechanics.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
217 Agricultural Sciences & Technology  
218 Agricultural Sciences & Technology

**491160 Agriculture Structural Systems I**

Credit: .5 Grade Levels: 9-12

Students will be introduced to basic practices used in farm building and construction of facilities for the farm. Topics include FFA, SAEs, safety, planning, tools, basic construction, and surveying.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491170 Agriculture Structural Systems II**

Credit: .5 Grade Levels: 9-12

This course is a follow-up to Ag Structures I. A more in-depth look will be given to the technical areas of the agriculture structural industry. Topics will include FFA, SAEs, safety, concrete and masonry structures, basic carpentry, plumbing, electricity, metal fabrication, and painting and finishing.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491180 Animal Science**

Credit: .5 Grade Levels: 9-12

Topics covered in Animal Science include animal biotechnology, animal behavior, classification, consumer concerns, animal welfare, genetics, scientific selection, reproduction, growth and development, nutrition, meat science, and diseases.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491190 Aquaculture**

Credit: .5 Grade Levels: 9-12

This course is the science of water farming. It includes the production and marketing of aquatic animals and plants.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491200 Biological Animal Science**

Credit: .5 Grade Levels: 9-12

This course is a scientific approach to animal science using scientific principles and applied management practices. An emphasis on selection and industry review will be based on scientific data.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491210 Biological Plant Science**

Credit: .5 Grade Levels: 9-12

This course is a scientific approach to plant science using scientific principles and applied management practices. An emphasis on selection and industry review will be based on scientific data.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture  
605 Forestry

**491370 DWE-Approved Agriculture**

Credit: 1 Grade Levels: 9-12

This is an individually approved course in agriculture submitted by the district.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**590050 DWE-Approved Agriculture**

Credit: 1 Grade Levels: 9-12

This is an individually approved course in agriculture submitted by the district.

Does course count in required 38 units and, if yes, how: No

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491320 DWE-Approved Meat Processing Laboratory**

Credit: 1 Grade Levels: 9-12

This laboratory-specific course is designed to develop skill in the slaughter and processing of animals. The course emphasizes safety, sanitation, equipment care and maintenance, slaughter procedures, wholesale and retail meat fabrication, meat quality including quality and yield grade, preparation, and merchandising trends. Instruction will include career opportunities, leadership activities, aspects of HASSIP, and other practices related to the meat-packing industry. Districts desiring to implement this course should request approval from the Agriculture Education Office.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491220 Entrepreneurship**

Credit: .5 Grade Levels: 9-12

The course includes the ownership and management of a business to meet the market needs and make a profit. Risk management, ownership, partnership, and marketing are key aspects.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture  
605 Forestry

**491230 Environmental Resources**

Credit: .5 Grade Levels: 9-12

This course focuses on environmental concerns related to soil, air, and water. Emphasis is placed on soil and water in relation to agricultural processes. Students will also investigate ways to conserve soil and water and prevent contamination.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
605 Forestry

**491240 Floriculture**

Credit: .5 Grade Levels: 9-12

This course covers the principles of design, merchandising, careers, selection, storage, supplies, management practices, ownership, and employment in the floriculture industry.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture

**491250 Food Science Technology**

Credit: .5 Grade Levels: 9-12

This course examines the food industry in production, manufacturing/processing, distribution, and marketing. It also explores careers, consumer consumption, food safety, global commodities, and food companies.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology

**491260 Forestry**

Credit: .5 Grade Levels: 9-12

This course provides an overview of the forest industry and its importance to the economy of the nation. Tree identification, management practices, harvesting and marketing processes, and business applications are major topics. GPS and GIS are included.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
605 Forestry

**491270 Greenhouse Management**

Credit: .5 Grade Levels: 9-12

This course covers greenhouse management practices, including structural considerations, plant propagation, pesticide use, and product marketing. The student will also receive ample hands-on practice.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture

**491280 Intro to Horticultural Science**

Credit: .5 Grade Levels: 9-12

This course covers basic plant systems, pest control, and the areas of greenhouse management, nursery and landscaping, and turf management. This course is recommended for those students interested in the horticulture program of study.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture

**491300 Leadership & Communications**

Credit: .5 Grade Levels: 9-12

Public speaking, parliamentary procedure, organization, delegation, oral communication, conflict resolution, business etiquette, and community service are major topics to assist students in development of their leadership skills for the future.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture  
605 Forestry

**491310 Managing Our Natural Resources**

Credit: .5 Grade Levels: 9-12

Students will explore natural resources (soil, water, air, forests, energy, minerals and metals, and wildlife) and develop the knowledge and skills to use them wisely. Other issues include outdoor recreation, careers, and the environment.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
605 Forestry

**491330 Nursery/Landscape**

Credit: .5 Grade Levels: 9-12

This course covers the production of plants, shrubs, and ornamental trees for transplanting to landscape designs. Propagation, designing plans, installation, maintenance, transportation, and careers are included in the curriculum. This course is approved for the Centerpoint School District only. Other districts must request approval prior to implementation.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture

**491340 Plant Science**

Credit: .5 Grade Levels: 9-12

This course covers the relationship between plants and people, plant morphology and physiology, plant production, the environment, soil, and other related areas.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 010 Agriculture  
218 Agricultural Sciences & Technology  
604 Horticulture  
605 Forestry

**491350 Small Engine Technology**

Credit: .5 Grade Levels: 9-12

This course examines the uses of small engines in all areas of agriculture. Selection, maintenance and repair, careers, and employability are major topics.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course:	010	Agriculture
	218	Agricultural Sciences & Technology
	604	Horticulture
	605	Forestry

**491360 Turf Grass Management**

Credit: .5 Grade Levels: 9-12

This course covers all aspects of turf grass management, including lawn care, turf production, golf course management, sports turf, irrigation, equipment, maintenance, and human relations.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course:	010	Agriculture
	218	Agricultural Sciences & Technology
	604	Horticulture

**COURSES ONLY: WORK-BASED LEARNING; SUPPORT; SPECIAL POPULATIONS;  
& MISCELLANEOUS COURSES**

**493860 Internship**

Credit: 1 Grade Levels: 11-12

This is a practical and supervised job experience designed to assist students to successfully transition from school-to-work or successfully continue their education in a chosen career focus/major area. Internships are individualized and competency-based.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 412 Career Preparation

**493880 Workplace Readiness**

Credit: .5 Grade Levels: 10-12

This one-semester course is designed to help students transition from school to work. It focuses on the SCANS competencies with emphasis on problem solving, teamwork, communication skills, and the use of technology.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 412 Career Preparation

**460010 EAST/Workforce Technology**

Credit: 1 Grade Levels: 9-12

This one year of EAST Lab experience is designed to help students transition from school to work. It focuses on the SCANS competencies with emphasis on problem solving, teamwork, communications skills, and the use of technology. It counts as one unit of credit toward completer status in any of the career and technical areas of study.

Does course count in required 38 units and, if yes, how: Yes ADE

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 412 Career Preparation



## **Special Populations**

### **493800 JAG Apprenticeship/Work-Based Learning**

Credit: 1 Grade Levels: 11-12

This is an instructor-supervised work release course that includes monthly employer evaluations of participants. Employment is not a requirement of the JAG program, but credit can be given at the discretion of the individual school district. Participants should be expected to complete 180 hours of work-based learning in order to receive one credit—with a maximum of four credits for completing 720 hours of work study within a consecutive two-year period.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 413 Career Services for Special Populations

### **493780 JAG Multi-Year I**

Credit: 1 Grade Levels: 11-12

JAG utilizes the National Jobs for America's Graduates model. It is designed to assist career and technical students whose ability to successfully graduate from high school and obtain meaningful employment is in jeopardy.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 413 Career Services for Special Populations

### **493790 JAG Multi-Year II**

Credit: 1 Grade Levels: 11-12

JAG utilizes the National Jobs for America's Graduates model. It is designed to assist career and technical students whose ability to successfully graduate from high school and obtain meaningful employment is in jeopardy.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 413 Career Services for Special Populations

### **493770 JAG Senior Applications**

Credit: 1 Grade Levels: 12

JAG utilizes the National Jobs for America's Graduates model. It is designed to assist career and technical students whose ability to successfully graduate from high school and obtain meaningful employment is in jeopardy.

Does course count in required 38 units and, if yes, how: Yes Career & Technical

Does course count in the 21 units required for graduation: Yes

Licensure required to teach this course: 413 Career Services for Special Populations

## **MIDDLE SCHOOL COURSES**

**399030 Intro to World Agriculture Science**

Credit:      Grade Levels: 7-8

This is a foundation course for agriculture courses. Basic agriculture concepts are introduced, and students explore careers in the agriculture industry. Students will also be introduced to the FFA, leadership, and Supervised Agricultural Experiences.

Does course count in required 38 units and, if yes, how:    No

Does course count in the 21 units required for graduation:    No

Licensure required to teach this course:	010	Agriculture
	217	Agricultural Sciences & Technology
	218	Agricultural Sciences & Technology

**TECHNOLOGY STANDARDS  
2005-2006**

**COMPUTER SYSTEM FOR:   MIDDLE SCHOOL  
                                      JR HIGH SCHOOL  
                                      HIGH SCHOOL  
                                      INSTRUCTOR/TEACHER**

**LEVEL I**

Pentium® 4 processor (or equivalent) 2.80GHz, 800 MHz, 512K cache, 512MB DDR RAM, 17" CTL, true flat panel color monitor or 17" CRT true flat screen monitor, integrated video graphics card, 40GB hard drive, 1.44MB 3.5-inch floppy drive, USB 2-button optical mouse with scroll, integrated (10/100/1000) network card, 52x32x52X DVDRW OR 48x or 52x CDRW-ROM, integrated sound blaster compatible, speakers w/headphones, Internet accessible

AGRICULTURAL SCIENCE
Agribusiness Systems
Power, Structural, & Tech Systems
Animal Systems
Plant Systems (Biological)
Plant Systems (Horticulture)
Natural Resources/Environmental Serv Syst

<b>TECHNOLOGY STANDARDS</b> <b>2006-2007</b>
---

**COMPUTER SYSTEM FOR: MIDDLE SCHOOL  
JR HIGH SCHOOL  
HIGH SCHOOL  
INSTRUCTOR/TEACHER**

**LEVEL I**

Pentium 4, 3.0GHZ, 800 MHz, LGA775, mid tower ATX case, w/300w power supply, FUSB 80.0GB hard drive, 7200 rpm, 512 MB DDR2-533 RAM, integrated video graphics card, 17" monitor, true flat screen, color CRT (tube) 1.44 MB floppy drive, 104-key Win keyboard, optical wheel mouse w/pad, DVD/CDRW combo drive, 48x or 52x CD-ROM drive, integrated audio w/AC speakers & headphones, Microsoft Window XP Pro operating system, 10/100/1000 integrated network card

<b>Agricultural Science &amp; Technology</b>
<b>Agriculture, Food, &amp; Natural Resources Cluster</b>

## OFFICE OF AGRICULTURAL SCIENCE AND TECHNOLOGY EDUCATION

### STATE STAFF:

Office of Agricultural Science and Technology

Room 501

(501) 682-2561

Fax:

(501) 682-1268

Marion Fletcher, Program Manager

E-mail: [marion.fletcher@arkansas.gov](mailto:marion.fletcher@arkansas.gov)

Patti Priest, Area Supervisor

E-mail: [patti.priest@arkansas.gov](mailto:patti.priest@arkansas.gov)

Dr. Ann Horne, Area Supervisor

E-mail: [ann.horne@arkansas.gov](mailto:ann.horne@arkansas.gov)

### CAREER CLUSTER: AGRICULTURE, FOOD, AND NATURAL RESOURCES

The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources

#### Program Description

Agricultural science and technology education is an organized educational program designed to provide career exploration and technical preparation for students who are preparing for career success in the Agriculture, Food, and Natural Resources Career Cluster. The knowledge and performance skills required for successful achievements and/or advancement in agricultural occupations constitute the central focus of the program.

#### Occupational Program

The Agriculture, Food, and Natural Resources Career Cluster offers sequential career focus programs of study in pathways.

Each local education agency should plan a program(s) of study to meet the needs of students in the community. Each program teaching agricultural power, structural, and technical systems must offer one additional program of study.

#### Student Organization

The career and technical student organization FFA shall be an integral part of the agriculture education instructional program and shall follow the applicable guidelines, goals, objectives, and participate in activities of the state and National FFA Organization.

## AGRICULTURE PREREQUISITES

COURSES	PRE-REQUISITE COURSE(S)
Advanced Animal Science	Animal Science
Agriculture Mechanics II	Agriculture Mechanics I
Agricultural Metals II	Agricultural Metals I
Agriculture Power Systems II	Agriculture Power Systems I
Agriculture Structure Systems II	Agriculture Structure Systems I
Biological Animal Science	Animal Science
Biological Plant Science	Plant Science

Programs of study (pathways):

Agribusiness Systems

Course Code	Core Requirements	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
491030	Agricultural Business	.5			X	X	X	X
491060	Agricultural Marketing	.5			X	X	X	X
491150	Agriculture Science & Technology *	1			X	X	X	X

Power, Structural, and Technical Systems (Agricultural)

Course Code	Core Requirements	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
491100	Agriculture Mechanics I	.5			X	X	X	X
491110	Agriculture Mechanics II	.5			X	X	X	X
491150	Agriculture Science & Technology	1			X	X	X	X

Animal Systems

Course Code	Core Requirements	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
491150	Agriculture Science & Technology *	1			X	X	X	X
491180	Animal Science	.5			X	X	X	X
491200	Biological Animal Science	.5			X	X	X	X

Plant Systems (Biological)

Course Code	Core Requirements	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
491150	Agriculture Science & Technology *	1			X	X	X	X
491210	Biological Plant Science	.5			X	X	X	X
491340	Plant Science	.5			X	X	X	X

Plant Systems (Horticulture)

Course Code	Core Requirements	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
491150	Agriculture Science & Technology *	1			X	X	X	X
491270	Greenhouse Management	.5			X	X	X	X
491280	Intro to Horticultural Science	.5			X	X	X	X

# Natural Resource Systems/Environmental Service Systems

Course Code	Core Requirements	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
491150	Agriculture Science & Technology *	1			X	X	X	X
491230	Environmental Resources	.5			X	X	X	X
491310	Managing Our Natural Resources	.5			X	X	X	X

\* Agriculture Science & Technology may be replaced by Agriculture Science as a core course if the agricultural power, structural, & tech systems program of study is not being offered.

## AGRICULTURE SCIENCE AND TECHNOLOGY COURSES:

Course Code	Elective Courses	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
491010	Advanced Animal Science	.5			X	X	X	X
491020	Agricultural Apprenticeship/Work-Based Learning	1					X	X
491030	Agricultural Business	.5			X	X	X	X
491040	Agricultural Electricity	.5			X	X	X	X
491050	Agricultural Graphics	.5			X	X	X	X
491060	Agricultural Marketing	.5			X	X	X	X
491070	Agricultural Metals I	.5			X	X	X	X
491080	Agricultural Metals II	.5			X	X	X	X
491090	Agricultural Surveying	.5			X	X	X	X
491100	Agriculture Mechanics I	.5			X	X	X	X
491110	Agriculture Mechanics II	.5			X	X	X	X
491120	Agriculture Power Systems I	.5			X	X	X	X
491130	Agriculture Power Systems II	.5			X	X	X	X
491140	Agriculture Science	.5			X	X	X	X
491150	Agriculture Science & Technology	1			X	X	X	X
491160	Agriculture Structural Systems I	.5			X	X	X	X
491170	Agriculture Structural Systems II	.5			X	X	X	X
491180	Animal Science	.5			X	X	X	X
491190	Aquaculture	.5			X	X	X	X
491200	Biological Animal Science	.5			X	X	X	X
491210	Biological Plant Science	.5			X	X	X	X
491220	Entrepreneurship	.5			X	X	X	X
491230	Environmental Resources	.5			X	X	X	X
491240	Floriculture	.5			X	X	X	X
491250	Food Science Technology	.5			X	X	X	X
491260	Forestry	.5			X	X	X	X
491270	Greenhouse Management	.5			X	X	X	X
491280	Intro to Horticulture	.5			X	X	X	X
491300	Leadership & Communications	.5			X	X	X	X
491310	Managing Our Natural Resources	.5			X	X	X	X
491330	Nursery/Landscape	.5			X	X	X	X
491340	Plant Science	.5			X	X	X	X
491350	Small Engine Technology	.5			X	X	X	X
491360	Turf Grass Management	.5			X	X	X	X



Course Code	Special Elective Courses	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
	Seek DWE prior approval before implementation.							
491370	DWE-Approved Agriculture	1			X	X	X	X
590050	DWE-Approved Agriculture	1			X	X	X	X
491320	DWE-Approved Meat Processing Laboratory	1			X	X	X	X

Course Code	DWE Middle School Electives	Units of Credit	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
399030	Intro to World Agriculture Science	.5	X	X				

## **AGRICULTURE SCIENCE AND TECHNOLOGY**

CLUSTER: AGRICULTURE, FOOD, AND NATURAL RESOURCES

PATHWAY: AGRIBUSINESS SYSTEMS

PROGRAM OF STUDY: AGRIBUSINESS SYSTEMS

### **MINIMUM INSTRUCTIONAL EQUIPMENT AND SOFTWARE**

<b>Item Number</b>	<b>Item Name</b>	<b>Number per Dept.</b>	<b>Specification/Description</b>
1	Computer system	20	See Technology Standards
2	Printer	5	

## AGRICULTURE SCIENCE AND TECHNOLOGY

CLUSTER: AGRICULTURE, FOOD, AND NATURAL RESOURCES

PATHWAY: PLANT SYSTEMS (HORTICULTURE)

PROGRAM OF STUDY: PLANT SYSTEMS (HORTICULTURE)

### MINIMUM INSTRUCTIONAL EQUIPMENT AND SOFTWARE

Item Number	Item Name	Number per Dept.	Specification/Description
1	Greenhouse	1	Minimum of 1,800 sq.ft. w/environmental system
2	Worktables	2	4' x 8'
3	Soil sterilizer	1	¼-yard capacity
4	Soil test kit	1	
5	Microscopes	10	10x, 40x objectives
6	Water test kit	1	Nitrate, phosphate, & alkaline
7	Tiller	1	5 hp
8	Mower	1	
9	Grass trimmer	1	
10	Backpack blower	1	2-cycle
11	Table system for greenhouse	1	
12	Horticulture tool kit	1	
13	Plant/flower models	Set	
14	Emergency shower	1	
15	Plant growth chart	1	
16	Microscope, compound	1	

## AGRICULTURAL SCIENCE AND TECHNOLOGY

CLUSTER: AGRICULTURE, FOOD, AND NATURAL RESOURCES

PATHWAY: POWER, STRUCTURAL, AND TECHNICAL SYSTEMS (Agricultural)

PROGRAM OF STUDY: POWER, STRUCTURAL, AND TECHNICAL SYSTEMS (Agricultural)

### MINIMUM INSTRUCTIONAL EQUIPMENT AND SOFTWARE

Item Number	Item Name	Number Needed	Specification/Description
1	Oxyacetylene welding outfit	2	Single-stage installation A manifold
2	Oxyacetylene welding tables	2	
3	Anvil	1	70 lb.
4	Grinder/sander	1	7" disk
5	Bench grinder	1	1" x 7", 1/2 hp
6	Arc welder	2	225 amp, AC-DC
7	MIG welder	1	
8	Arc welding table	2	36" x 36"
9	Drill press	1	Floor model, 1/2"
10	Band saw	1	14", 1/2 hp, 115 v
11	Drill, electric	1	3/8"
12	Drill, electric	1	1/2" reversing, 5 amp/450 rpm
13	Electric handsaw	1	7"
14	Electric sander	1	4" belt
15	Saber saw	1	3"
16	Engine, air cool gas	2	4-cycle & 2-cycle
17	Micrometer, inside/outside	1	
18	Air compressor	1	150 psi, 80-gal. tank
19	Gun, spray paint	1	1 qt.
20	Table saw	1	10", 2 hp
21	Tap & die set	1	
22	Level, automatic pkg.	1	15 minutes (1/4") damping – air, suspension ball bearing
23	Planer	1	18"
25	Acetylene welding tool pkg.	1	
26	Arc welding tool pkg.	1	
27	Sheet metal tool pkg.	1	
28	Plumbing	1	
29	Concrete tool pkg.	1	
30	Cold metal tool pkg.	1	
31	Woodworking tool pkg.	1	
32	Power machines tool pkg.	1	
33	Electricity tool pkg.	1	
34	Small gas engines tool pkg.	1	
35	Surveying	1	
36	Agri graphics tool pkg.	1	
37	Eye protection cabinet	1	
38	Cabinets for each area	12	

Note: Same equipment is required regardless of class size.

## AGRICULTURE SCIENCE AND TECHNOLOGY

CLUSTER: AGRICULTURE, FOOD, AND NATURAL RESOURCES

PATHWAY: NATURAL RESOURCE SYSTEMS/ENVIRONMENTAL SERVICE SYSTEMS

PROGRAM OF STUDY: NATURAL RESOURCE SYSTEMS/ENVIRONMENTAL SERVICE SYSTEMS

### MINIMUM INSTRUCTIONAL EQUIPMENT AND SOFTWARE

Item Number	Item Name	Number per Dept.	Specification/Description
1	Clinometer	5	
2	Altimeter	5	
3	Land measuring wheel	1	
4	Tree injector	1	
5	Drip torch	1	
6	Firefighting pump	1	
7	Increment borer	1	
8	Tree marking gun	5	Backpack, 2-cycle
9	Mist blower	1	
10	Stereoscope	1	5" common field of view
11	Chainsaw	1	16", 2-cycle
12	Forestry instructional kit	1	
13	Safety equipment kit	1	
14	Wheeler caliper	1	
15	Relaskop	1	
16	Fire weather kit	1	
17	Compass	5	
18	GPS receiver	2	
19	Staff compass	1	
20	Laser level or automatic level	1	
21	Soil test kit	1	
22	Water test kit	1	

## AGRICULTURE SCIENCE AND TECHNOLOGY

CLUSTER: AGRICULTURE, FOOD, AND NATURAL RESOURCES

PATHWAY: PLANT SYSTEMS (Biological)

PROGRAM OF STUDY: PLANT SYSTEMS (Biological)

### MINIMUM INSTRUCTIONAL EQUIPMENT AND SOFTWARE

Item Number	Item Name	Number Per Dept.	Specification/Description
1	Microscopes	10	10x, 40x objectives
2	Soil tester	1	
3	Water test kit	1	
4	Light meter	1	0-2,000 foot candles
5	Environmental chamber	1	
6	Hydroponic tabletop unit	1	Double unit
7	Indoor growing lab	1	Aluminum frame, timer on light, 4' adjustable fluorescent lights
8	Teaching microscope	1	
9	Air pollution test kit	1	
10	Deep soil corning tube	1	
11	Classroom aquaculture system	1	
12	Environmental data logger	1	
13	pH meter	1	

## **AGRICULTURE SCIENCE AND TECHNOLOGY**

CLUSTER: AGRICULTURE, FOOD, AND NATURAL RESOURCES

PATHWAY: ANIMAL SYSTEMS

PROGRAM OF STUDY: ANIMAL SYSTEMS

### **MINIMUM INSTRUCTIONAL EQUIPMENT AND SOFTWARE**

<b>Item Number</b>	<b>Item Name</b>	<b>Number Per Dept.</b>	<b>Specification/Description</b>
1	Incubator, teaching unit	1	
2	Aquarium kit, ecosystem	1	
3	Refrigerator	1	
4	Microwave oven	1	
5	Food grinder	1	
6	Teaching microscope	1	
7	Air pollution test kit	1	
8	Deep soil corning tube	1	
9	Classroom aquaculture system	1	
10	Environmental data logger	1	
11	pH meter	1	